

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) In a multi-stage turbine fuel pump for automotive vehicles, the pump having an inlet section through which low pressure fuel is drawn into the pump, the inlet section includes an end cap having a recess formed therein, the pump further having a first pump stage, which includes an impeller and a port plate in which the impeller is installed, the port plate having an open sided, spaced channel which has an internal circular sidewall formed therein, and the pump also having a second pump stage, which includes a casing in which a second impeller is installed, the casing having another recess formed therein and the pump further having an outlet section through which high pressure fuel is discharged from the pump, the improvement comprising:

alignment means for assembling together and properly aligning components comprising the respective first and second pump stages, the alignment means maintaining alignment of the components during and after pump assembly and dissipating forces which otherwise would be concentrated about the alignment means which could cause failure of the components a spring pin extending between the recesses of the end cap and the casing and extending within the circular sidewall of the open sided, spaced channel of the port plate such that the circular sidewall substantially encapsulates the spring pin wherein the spring pin aligns the inlet section and the first and second pump stages such that expansion forces exerted by the spring against the circular sidewall dissipate through the end cap and the port plate.

2. (Cancelled)

3. (Cancelled)

4. (Currently Amended) The fuel pump improvement of claim 1 3 further including a second spring pin for aligning the components the inlet section, the first and second pump stages and the outlet section, and including a second recess open channel formed in each of the end cap, port plate, and casing and

further including a second open sided, spaced channel formed in the port plate in which the second spring pin is received.

5. (Cancelled)
6. (Cancelled)
7. (Currently Amended) The fuel pump improvement of claim 4 in which each spring pin has a hollow, cylindrical shape with a longitudinal slot extending the length of the pin.
8. (Cancelled)
9. (Currently Amended) The fuel pump improvement of claim 4 in which the pins are made of a spring material, the springs being compressed when inserted in the channels of the port plate with the pins thereafter expanding against a each circular sidewall of the channels with the force exerted by the pins on the channel sidewalls maintaining alignment of the components inlet section and the first and second pump stages.
10. (Currently Amended) The fuel pump improvement of claim 4 in which the two spring pins, and the open channels recesses formed in the end cap, port plate, and the casing and the open sided, spaced channels formed in the port plate are arranged in a predetermined angular relationship with each other for proper alignment of the fuel pump components during pump assembly.

11. (Currently Amended) A multi-stage turbine fuel pump for automotive vehicles comprising:

an inlet section through which low pressure fuel is drawn into the pump, the inlet section including an end cap having a recess formed therein;

a first pump stage, including an impeller and a port plate in which the impeller is installed, the port plate having an open sided, spaced channel which has an internal circular sidewall formed therein; and

a second pump stage, including a casing in which a second impeller is installed, the casing having another recess formed therein;

an outlet section through which high pressure fuel is discharged from the pump; and,

alignment means for aligning the components comprising the respective first and second pump stages, the alignment means maintaining alignment of the components during and after the pump is assembled and dissipating forces which otherwise would be concentrated about the alignment means which could cause failure of the components a spring pin extending between the recesses of the end cap and the casing and extending within the circular sidewall of the open sided, spaced channel of the port plate such that the circular sidewall substantially encapsulates the spring pin wherein the spring pin aligns the inlet section and the first and second pump stages such that expansion forces exerted by the spring against the circular sidewall dissipate through the end cap and the port plate.

12. (Cancelled)

13. (Currently Amended) The fuel pump of claim 12 11 including a pair of spring pins for connecting the components the inlet section, the first and second pump stages and the outlet section together, the spring pins being installed on opposite sides of the fuel pump and an open channel formed in partially within the end cap, port plate, and casing in which each of the spring pins is received.

14. (Cancelled)

15. (Cancelled)

16. (Currently Amended) The fuel pump of claim 15 13 in which each spring pin has a hollow, cylindrical shape with a longitudinal slot extending the length of the pin, the pins being made of a spring material, and each pin being compressed when inserted in place for the pin to thereafter press against a the circular sidewall of the channel in which it is inserted, the force exerted by the pin on the channel sidewall maintaining alignment of the components the inlet section, the first and second pump stages and the outlet section.

17. (Currently Amended) An alignment means for use in a multistage turbine fuel pump for aligning components comprising respective stages of the pump, the alignment means including a spring pin made of a spring material and having a hollow, cylindrical shape with a longitudinal slot extending the length of the pin and the fuel pump components each having an open a channel formed

therein with such that the spring pin, when installed in the channel, exerting exerts a force on the components to maintain them in alignment.

18. (Currently Amended) The alignment means of claim 17 including a pair of substantially identically formed spring pins, the fuel pump components including respective open channels for each pin wherein the channels substantially encapsulate each pin.

19. (Currently Amended) The alignment means of claim 18 each spring pin has a hollow, cylindrical shape with a longitudinal slot extending the length of the pin, wherein each pin being is compressed when inserted in a the channel for the pins to thereafter press against a sidewall of the channel in which it is inserted, the force exerted by the pin on the channel sidewall holding the components in alignment.

20. (Original) The alignment means of claim 19 in which the two spring pins and the open channels formed in which the spring pins are received are arranged in a preferred orientation to properly align the components during pump assembly.

21. (Original) The alignment means of claims 19 in which the fuel pump is a two stage fuel pump having an inlet end cap, a first stage port plate and a second stage casing, the inlet end cap, port plate, and casing each having open channels formed therein in which the respective spring pins are received, thereby to dissipate forces transferred from the spring pins to these components rather than concentrating the forces thereabout and causing damage to the components.